What is claimed is:

1. An apparatus for identifying human organs from an input ultrasound image signal, comprising:

a first feature vector determiner for determining a first feature vector of the input ultrasound image signal;

a memory for storing a list of predetermined types of organs and a plurality of ultrasound images in association with each of the predetermined types of organs;

a second feature vector determiner for determining respective second feature vectors of the ultrasound images for each of the predetermined types of organs;

a calculator for calculating an average vector and a standard deviation vector of the second feature vectors for each of the predetermined types of organs; and

an organ determiner for selecting one of the average vectors for the predetermined types of organs based on the first feature vector and the average vectors and the standard deviation vectors for the predetermined types of organs, and for determining an organ corresponding to the selected average vector as an organ corresponding to the input ultrasound image signal.

2. The apparatus of claim 1, wherein the first feature vector determiner comprises a first pre-processor and a first feature vector extractor,

wherein the first pre-processor includes a first sub-sampler for sub-sampling the input ultrasound image signal; a first window-processor for window-processing the sub-sampled ultrasound image signal; and a first normalizer for normalizing brightness and contrast of the window-processed ultrasound image signal, and

wherein the first feature vector extractor includes a first log power spectrum extractor for extracting a first log power spectrum from the pre-processed ultrasound

image signal; and a first feature vector detector for detecting the first feature vector from the first log power spectrum.

3. The apparatus of claim 2, wherein the second feature vector determiner comprises a second pre-processor and a second feature vector extractor,

wherein the second pre-processor includes a second sub-sampler for sub-sampling the ultrasound images stored in the memory; a second window-processor for window-processing the sub-sampled ultrasound images; and a second normalizer for normalizing brightness and contrast of the normalized ultrasound images, and

wherein said second feature vector extractor includes a second log power spectrum extractor for extracting second log power spectrums from the pre-processed ultrasound images; and a second feature vector detector for detecting the second feature vectors from the second log power spectrums of the pre-processed ultrasound images.

4. The apparatus of claim 3, wherein the organ determiner comprises:

a calculator for calculating distances between the first feature vector and the average vectors for the predetermined types of organs; and

a determiner for determining an organ corresponding to an average vector having the shortest distance from the first feature vector as the organ corresponding to the input ultrasound image signal.

5. The apparatus of claim 4, wherein the first log power spectrum F(u,v) is computed by the following equation:

$$F(u,v) = \log \left| \Im\{I_N(m,n)\} \right|$$

where (m,n) represents a coordinate position of an organ in the input ultrasound image,

$I_N(m,n)$ is the first normalized input ultrasound image signal, and $\Im$ is a Discrete Fourier Transform operator; and

wherein the first feature vector $\boldsymbol{f}$ of the input ultrasound image signal is represented by the following equation:

$$f = \{F(0.0), F(0.1), \ldots, F(\mathrm{U},\mathrm{V})\}$$

where U and V are integers for delimiting a predetermined frequency region to determine the first feature vector of the input ultrasound image signal.

6. The apparatus of claim 4, wherein the average vector $\overline{F_k}(u,v)$ of the ultrasound images for the k-th organ is calculated by the following equation:

$$\overline{F_k}(u,v) = \frac{1}{M}\sum_{i=1}^{M} F^i{}_k(u,v), \quad k=1,2,\ldots,K$$

where $F^i_k(u,v)$ is the second feature vector of the i-th ultrasound image for the k-th organ, M is the number of the ultrasound images for the k-th organ, and K is the number of the types of organs stored in the memory.

7. The apparatus of claim 4, wherein the standard deviation vector $\boldsymbol{\sigma}_k(u,v)$ of the ultrasound images for the k-th organ is calculated by the following equation:

$$\sigma_k(u,v) = \left\{\frac{1}{M}\sum_{i=1}^{M}\left\{F^i{}_k(u,v) - \overline{F_k}(u,v)\right\}^2\right\}^{1/2} \quad k=1,2,\ldots,K$$

where $F^i_k(u,v)$ is the second feature vector of the i-th ultrasound image for the k-th organ, $\overline{F_k}(u,v)$ is the average vector of the ultrasound images for the k-th organ, M is the number of the ultrasound images for the k-th organ, and K is the number of the types of organs stored in the memory.

8. The apparatus of claim 4, wherein the distance between the first feature vector

and the average vectors for the predetermined types of organs is computed according to the following equation,

$$d(f,\overline{f}_k) = \left\| \frac{f - \overline{f}_k}{\sigma_k} \right\|, \quad k=1,2,...,K$$

where f is the first feature vector, $\overline{f}_k$ is the average vector of the ultrasound images for the k-th organ, and $\boldsymbol{\sigma}_\mathbf{k}$ is the standard deviation vector of the ultrasound images for the k-th organ.

9. A method for identifying human organs from an input ultrasound image signal comprising the steps of:

determining a first feature vector of the input ultrasound image signal;

storing in a memory a list of predetermined types of organs and a plurality of ultrasound images in association with each of the predetermined types of organs;

determining respective second feature vectors of the ultrasound images for each of the predetermined types of organs;

calculating an average vector and a standard deviation vector of the second feature vectors for each of the predetermined types of organs;

selecting one of the average vectors based on the first feature vector and the average vectors and the standard deviation vectors for the predetermined types of organs; and

determining an organ corresponding to the selected average vector as the organ corresponding to the input ultrasound image signal.

10. The method of claim 9, wherein the first feature vector determining step comprises a first pre-processing step and a first feature vector extracting step,

wherein the first pre-processing step includes the steps of sub-sampling the input ultrasound image signal; window-processing the sub-sampled ultrasound image signal; and normalizing brightness and contrast of the window-processed ultrasound image signal, and

wherein the first feature vector extracting step includes the steps of extracting a first log power spectrum from the pre-processed ultrasound image signal; and detecting the first feature vector from the first log power spectrum.

11. The method of claim 10, wherein the second feature vector determining step comprises a second pre-processing step and a second feature vector extracting step,

wherein the second pre-processing step includes the steps of sub-sampling the ultrasound images stored in the memory; window-processing the sub-sampled ultrasound images; and normalizing brightness and contrast of the window-processed ultrasound images, and

wherein the second feature vector extracting step includes the steps of extracting second log power spectrums from the pre-processed ultrasound images; and detecting the second feature vectors from the second log power spectrums.

12. The method of claim 11, wherein the organ determining step comprises the steps of calculating distances between the first feature vector and the average vectors for the predetermined types of organs; and determining an organ corresponding to an average vector having the shortest distance from the first feature vector as the organ corresponding to the input ultrasound image signal.

13. The method of claim 12, wherein the first log power spectrum F(u,v) is computed by the following equation:

$$F(u,v) = \log\left| \Im\{I_N(m,n)\} \right|$$

where (m,n) is a coordinate position of an organ in the input ultrasound image, $I_N(m,n)$ is the first normalized input ultrasound image signal, and $\Im$ is a Discrete Fourier Transform operator, and

wherein the first feature vector f of the input ultrasound image signal is represented by the following equation:

$$f = \{F(0.0), F(0.1), \ldots, F(\mathrm{U}, \mathrm{V})\}$$

where U and V are integers for delimiting a predetermined frequency region to determine the first feature vector of the input ultrasound image signal.

14. The method of claim 12, wherein the average vector $\overline{F_k}$ (u,v) of the ultrasound images for the k-th organ is calculated by the following equation:

$$\overline{F_k}(u,v) = \frac{1}{M}\sum_{i=1}^{M} F^i{}_k(u,v), \quad \text{k=1,2,....,K}$$

where $F^i_k(u,v)$ is the second feature vector of the i-th ultrasound image for the k-th organ, M is the number of the ultrasound images for the k-th organ, and K is the number of the types of organs stored in the memory.

15. The method of claim 12, wherein the standard deviation vector $\sigma_k(u,v)$ of the ultrasound images for the k-th organ is calculated by the following equation:

$$\sigma_k(u,v) = \left\{ \frac{1}{M}\sum_{i=1}^{M} \left\{ F^i{}_k(u,v) - \overline{F_k}(u,v) \right\}^2 \right\}^{1/2} \quad \text{k=1,2,...,K}$$

where $F^i_k(u,v)$ is the second feature vector of the i-th ultrasound image for the k-th organ, $\overline{F_k}$ (u,v) is the average vector of the ultrasound images for the k-th organ, M is the number of the ultrasound images for the k-th organ, and K is the number of the types of organs stored in the memory.

16. The method of claim 12, wherein the distance between the first feature vector and the average vectors for the predetermined types of organs is computed according to the following equation,

$$d(f,\overline{f}_k)=\left\|\frac{f-\overline{f}_k}{\sigma_k}\right\|,\quad \text{k=1,2,...,K}$$

where $\boldsymbol{f}$ is the first feature vector, $\overline{f}_k$ is the average vector of the ultrasound images for the k-th organ, and $\boldsymbol{\sigma}_k$ is the standard deviation vector of the ultrasound images for the k-th organ.